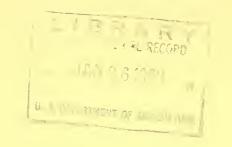
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SEARCH PAPER 59 AUGUST 1959



PRODUCTION-DISTRIBUTION TRENDS AND FREIGHT RATES AS THEY AFFECT MOUNTAIN STATES LUMBER PRODUCERS

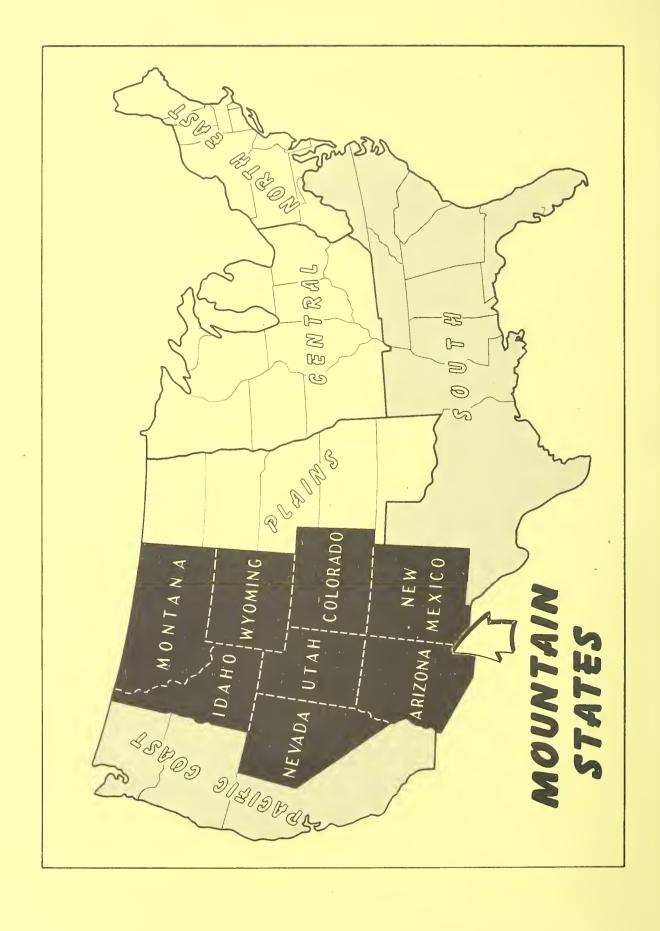
By

S. BLAIR HUTCHISON

DIVISION OF FOREST ECONOMICS



INTERMOUNTAIN FOREST & RANGE EXPERIMENT STATION
FOREST SERVICE
U. S. DEPARTMENT OF AGRICULTURE
OGDEN, UTAH
REED W. BAILEY, DIRECTOR



RESEARCH PAPER 59

AUGUST 1959

PRODUCTION-DISTRIBUTION TRENDS AND FREIGHT RATES
AS THEY AFFECT MOUNTAIN STATES LUMBER PRODUCERS X

ΒY

S. Blair (Hutchison)
Division of Forest Ecomomics



U. S. DEPARTMENT OF AGRICULTURE
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PRODUCTION-DISTRIBUTION TRENDS AND FREIGHT RATES AS THEY AFFECT

Bv

S. Blair Hutchison

INTRODUCTION

The Mountain States 1 have a lot of wood to sell. Their chronic difficulty has been that of having more wood than immediate markets for wood. This situation has risen because distance to market, topography, and other factors have imposed handicaps on development of the timber industry. However, recent events have shown that increasing national needs for wood and declining timber supplies are reducing these handicaps. They give reason for new hope and anticipation concerning future development of timber industries in general and the lumber and pulp industries in particular. This brighter outlook has, of course, underlined the importance of studies of resource development. A recent report published by this experiment station discusses the market opportunity for the timber of the region; 2/another, the potentialities of lodgepole pine for lumber.3/ Other studies, completed and under way. analyze development problems of specific

The following pages look at two other facets of the situation:

- The changing pattern of lumber production and consumption, and
- 2. Relationships that exist between rail transportation costs and lumber distribution patterns.

While production and consumption trends are results rather than causes, they do suggest the shape of things to come; and, although rail transportation is only one of the factors influencing where lumber goes, it is certainly an important one.

The following discussion and analysis is based mainly on lumber consumption and distribution data for 1922 and 1940 by the Bureau of the Census and the U.S.

Forest Service, and waybill statistics for 1953. 1954. and 1955 compiled by the Interstate Commerce Commission. The survevs of lumber distribution made in 1922 and 1940 have certain inadequacies and inaccuracies which require that we interpret them with caution. The waybill statistics appear to be an accurate sampling of rail freight traffic, but to show the complete lumber distribution picture, it was necessary to estimate truck shipments. Since data on truck shipments are not available. it was assumed that they were all intraregional. While some lumber is hauled between regions by truck, in terms of the total lumber distribution in the West, these shipments are believed to be of minor significance.

An additional difficulty is that there is apparently no published information on the distribution pattern by species. This is unfortunate, as the higher quality, higher priced woods which can carry a bigger freight cost are undoubtedly shipped further on the average than the lower value species associated with them.

Although these limitations of present data make a detailed analysis impossible, the information in the following pages is nevertheless definitive enough to indicate:

- Where Mountain States lumber is now being marketed.
- Production and distribution trends that have influenced the lumber industry in this region.
- The significance of freight rates to lumber marketing.
- Additional study that may be helpful in improving the market situation.

¹ Montana, Idaho, Wyoming, Utah, Nevada, Colorado, New Mexico, and Arizona.

² Hutchison, S. Blair, 1957. Market Prospects for Mountain States Timber, U. S. Forest Service, Intermountain Forest and Range Experiment Station Research Paper 50.

³ Wikstrom, John H. 1957. Lodgepole Pine—A Lumber Species, U. S. Forest Service, Intermountain Forest and Range Experiment Station Research Paper 46.

DISTRIBUTION OF MOUNTAIN STATES LUMBER

Table 1Lumber production in tain States, 1954	the Moun-
	Million bd. ft.
Idaho Montana Wyoming Colorado Utah Nevada Arizona New Mexico	1,399 738 81 174 51 28 258 222 2,951

Source: Bureau of the Census, U. S. Dept. of Commerce

Sawmills in the Mountain States produced 3 billion board feet of lumber in 1954 (table 1). The commercial forests in these States probably could sustain twice that production of lumber and in addition grow large quantities of pulpwood and other timber products. However, to market even 3 billion board feet, local sawmills must ship their products to the far corners of the United States. Every State in the Union, from Maine to Florida, from Oregon to New York, buys some lumber from the Mountain region. Figure 1 shows that half of the Mountain States lumber is shipped to eastern states.

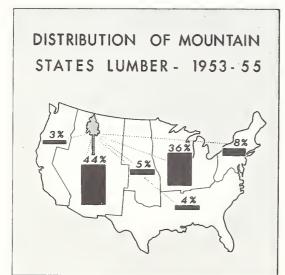


FIG. 1

The large volume of lumber going out of the region reflects partly the fact that these eight States, which have about 3½ percent of the population, produce roughly 8 percent of the Nation's lumber, or considerably more than they could possibly use. The wide distribution of Mountain States lumber also reflects a utility factor that should not be overlooked. Timber has been important in the development of this Nation, partly because it has been abundant and partly because there has been a wood for every purpose. strength of southern pines and Douglasfir, the beauty of the hardwoods, and the workability of other species satisfy a variety of national wood needs. Unfortunately, however, the qualities sought in lumber are not all found in the same species nor are they evenly distributed from a geographical standpoint. In other words, more or less local supplies must serve a national purpose and must be marketed nationally to command highest prices. This is true of California's redwood, of the many quality hardwoods grown in the East, and of soft-textured woods like ponderosa pine and white pine, found mainly in the West. These two pines, along with spruce, sugar pine, and lodgepole pine, are part of a soft-textured lumber category much in demand, but in relatively short supply. Although Mountain States sawmills produce only 8 percent of the total lumber cut, they produce almost one-third of the lumber in this particular soft-textured category. Moreover, the region probably has 40 percent of the producing capacity for this type of timber.

Table 2.--Apparent annual consumption of domestically produced lumber in the United States!/by major regions

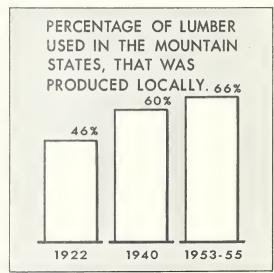
Consumer region	1922	1940	Average 1953-55
	Billi	on boa	rd feet
East Mountain Pacific Coast	27.3 1.0 5.3	22.8 1.2 6.3	28.8 1.9 7.3
United States	33.6	30.3	38.0

Even though much of the Mountain States lumber production is shipped out, the region is in the singular position of also being a substantial importer of lumber. It imports one board of every three it uses. Table 2 shows that in the period 1953-55, an average of 1.9 billion board feet was consumed annually in the Mountain States. Of that amount, approximately 600 million board feet came from the Pacific Coast. The size of these imports is significant because except for a few specialty woods, the Mountain States region has the kind of timber required to meet its own lumber needs.

Of course, it is unrealistic to suppose that Mountain States sawmills can capture all of the local market. The 53 million acres of commercial forest in the region are widely scattered, but most of the best stands are in central and northern Idaho. western Montana, and on the Coconino Plateau of Arizona and New Mexico. To date, lumbering has been concentrated in these areas. Actually, three-quarters of all the lumber produced in the Mountain States is cut by Idaho and Montana mills alone (table 1). The Denver and Salt Lake City trade areas, on the other hand, are the big, choice markets within the Mountain States. High operating costs and other factors have kept sawmills near Denver and Salt Lake from capturing these markets. At the same time, the lumber companies in Montana, Idaho, New Mexico, and Arizona have not moved into them to a great extent. The main rail lines run east and west, so north-south rail transportation is, generally speaking, awkward. In the period 1953-55, for example, only 3 percent of the lumber shipped by rail from Montana went to other Mountain States. It should be remembered that this figure is for rail shipments only. In recent years,

an increasing volume of lumber has moved from the north and south into the central Rocky Mountain market by truck; but before the modern truck transport was developed, the rail situation helped west coast mills capture much of this central Rocky Mountain market, most of which they still hold.

However, the changing complexion of the national lumber situation (which will be discussed later) is improving the opportunity for mills in the Mountain States to sell more of their lumber locally. Table 2 shows that use of lumber in the Mountain States has almost doubled since 1922. Moreover, whereas less than half of the lumber consumed in the region in 1922 was home grown, two-thirds of it is today (fig. 2).



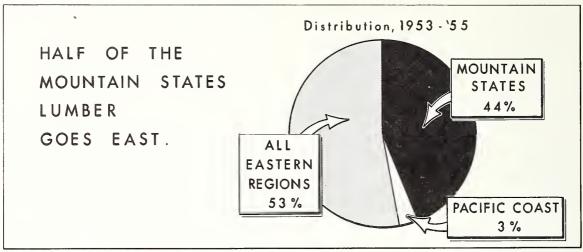


FIG. 3

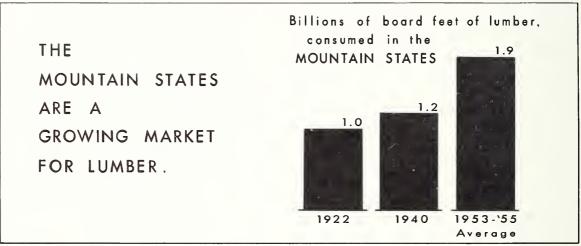


FIG. 4

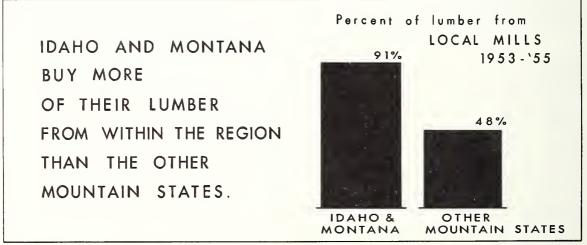
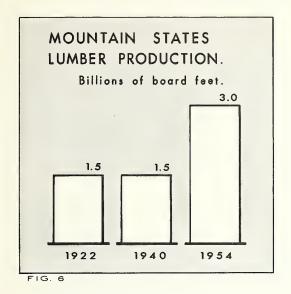


FIG. 5

FACTORS BEHIND THE UPSWING OF MOUNTAIN STATES LUMBER OUTPUT



The gratifying upswing of Mountain States lumber production since 1940 (fig. 6) can hardly be ascribed to the increasing appetite of a growing Nation because the country is not using much, if any, more lumber than it did several decades ago. From its deep slump in the depression thirties. United States lumber output has climbed back to where it was in the 1920's. The specific relationship varies depending on the years compared. For example, lumber production in the period 1920-24 averaged 36 billion board feet as compared with 37 billion in the 5 years 1950-54. In 1922, lumber output was 35 billion board feet; in 1954, 36 billion; but, no matter which figures are used, the conclusion is the same: The over-all trend of lumber output in the last 30 years has not been significantly up or down.

The opportunity for the Mountain States to sell more lumber in recent years is partly the result of a decline in lumber production in eastern United States, particularly in the South. From 1900 into the 1920's, lumber producers in the South were riding the crest. The 11 Southern States from Virginia to Texas were producing close to half of all the lumber used in the United States; but, as the old growth timber supply dwindled, lumber production in the South declined. In the 5-year period, 1950-54, one-fourth less lumber was produced in that region than in the period

1920-24. Sawmills in the Northeastern, Central, and Plains States are likewise turning out fewer boards than they did 30 years ago.

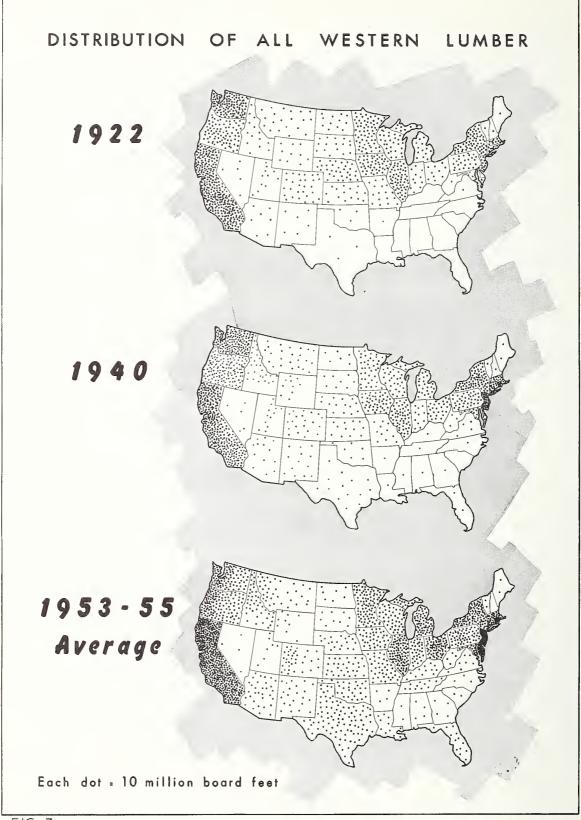
That western lumber moved into the gap is very evident. In the 1950's, the combined sawmill output of the Pacific and Mountain States was 60 percent greater than it was in the early 1920's. These States, which produced one-third of the lumber cut in the 1920's, now supply one-half of the Nation's lumber needs.

Table 3Shipments of Mountain States lumber to the East				
	1922	Average 1953-55		
	Million	n bd. ft.		
Northeast and				
Central	794	1,287		
South	6	119		
Plains	129	148		
Total	929	1,554		

The shift of the lumber industry to the West has greatly affected the pattern of lumber distribution. As figure 7 and table 3 show, western lumber has made gains in all markets. The biggest volume gains have been made in the Central-Northeastern market area.4/ However, a dramatic change has also taken place in the South. In 1922, and even in 1940, only a very small amount of lumber went to the 11 Southern States; but, today, the South buys about 1.5 billion board feet of western lumber, including 100 million from the Mountain States. This invasion took place mainly in Texas, but figure 7 shows that western lumber has effectively penetrated all southern markets.

Several factors account for the increased sale of western lumber in the South, not the least of which is the ability of west coast producers to undersell in almost every market. Increased consumption of Mountain States lumber in the South undoubtedly has resulted from a demand for soft-textured softwoods that is not being filled from elsewhere. Whatever these competitive factors are, they have been bolstered by the shortcomings of the

^{4/}Some lumber from the West is first shipped to intermediate points, such as the Minnesota Transfer, from which it is rebilled to a final destination on a new waybill showing the transfer station as the point of origin. This fact reduces the reliability of the statistics for the purposes here. It makes it particularly difficult to know how much lumber goes to the Northeast alone and to Central States alone. However, it is obvious that shipments to the Central States have increased relatively much more in the last three decades than shipments to the Northeast.



southern pine lumber industry itself. This segment of the lumber industry is cutting second growth timber that produces poorer quality lumber than the virgin stands. It is plagued by the problem of substandard manufacturing, a situation that has been aggravated by the predominance of small sawmills lacking the equipment, financing, and technical capacity to produce top-grade competitive lumber. It has been estimated that less than 20 percent of the lumber produced by the southern pine mills is sold by grade, which is hardly a sign of industrial strength.

A recent trend toward larger sawmills in the South should result in better quality and more efficiently produced pine lumber. In 1958, southern building code restrictions on moisture in lumber were tightened. This action will handicap west coast sawmills that have been shipping in green lumber. However, the net effect of these changes on the competitive situation in the South remains to be seen. There is every reason to suppose the South will continue to be an important market for western lumber in general and Mountain States lumber in particular.

Source: Western Pine Association

There is another factor behind the rapid increase in lumber production in the Mountain States since 1940. A tightening timber supply situation in the South and East created the opportunity for the western industry as a whole to grow. Now a similarly tightening supply situation in the west coast States opens the way for further expansion of the Mountain States lumber industry. In the past, the capacity of Washington, Oregon, and California

mills to outproduce and undersell Mountain States mills has fenced in all but the most efficient producers and the best timber. That advantage enjoyed by the west coast is now weakening. Southwestern Oregon and California were the only areas along the west coast where lumber production jumped in response to the higher prices following World War II. This strongly indicates that liquidation of virgin timber in Washington and the rest of Oregon has reached the point where the shoe has begun to pinch. Higher prices, engendered by the shortening supply, are enabling the Mountain States to compete on a somewhat more even footing than was possible in the past.

The fact that the Mountain States commercial forest runs heavily to soft-textured softwoods has also favored the recent rapid growth of the industry here. If price is any indication, softwoods like ponderosa pine are now harder to get than the softwoods serving structural purposes. Table 4 shows that prices of these softer woods advanced considerbly more than the price of Douglas-fir between 1939 and 1954. This not only has underlined the importance of already well-established species like ponderosa pine and white pine; it has opened the door to more complete development of species having comparable wood properties, such as spruce and lodgepole pine. The Mountain States have a lot of this soft-textured softwood timber.

Mountain States sawmills have, of course, also been favored by the fact that even though the total United States consumption of lumber has not changed much, the local market has increased considerably since 1920. Tremendous population growth in the Los Angeles area has created some new markets for Mountain States lumber there also. These factors and the region's better competitive situation in all markets have accounted for the big gains in production. Although the Mountain States lumber industry is still dwarfed by the industry of the west coast States, the relative increase in production in this region has been greater than that in the three coast States combined.

U. S. LUMBER
PRODUCTION
in billions of board feet
36
37

PRODUCTION
HAS CHANGED
LITTLE
SINCE 1920....

FIG. 8

U.S. PRODUCTION BY REGIONS BUT NORTH NORTH 18% MAJOR SHIFTS 14% WEST HAVE TAKEN PLACE 52% IN REGIONAL PRODUCTION. WEST SOUTH SOUTH 34% 48% 34% 1950 - '54 1920 - 24

FIG. 9

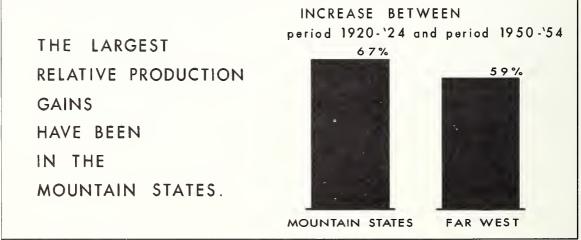


FIG. 10

	Origin region				
Destination region	Far West	Mountain	South	Plains Central East	Total
		– – Million	n board fee	t	
			1922		
Northeast Central Plains South	984 2,022 645 51	260 534 129 6	4,655 5,590 708 5,440	2,689 3,428 158 27	8,588 11,574 1,640 5,524
Total East	3,702	929	16,393	6,302	27,326
Mountain Far West	518 5,115	480 63	34 54	3 16	1,035 5,248
United States	9,335	1,472	16,481	6,321	33,609
			1940		
Northeast Central Plains South	1,885 2,081 393 230	195 398 72 25	1,663 2,991 217 7,765	2,250 2,375 166 50	5,993 7,845 848 8,070
Total East	4,589	690	12,636	4,841	22,756
Mountain Far West	483 6,153	744 94	6 27	5 5	1,238 6,279
United States	11,225	1,528	12,669	4,851	30,273
		Avera	age 1953-55	i.	
Northeast and Central Plains South	6,739 773 1,432	1,287 148 119	 		
Total East	8,944	1,554	12,978	5,301	28,777
Mountain Far West	625 7,111	1,261 81	19 129	10 18	1,915 7,339
United States	16,680	2,896	13,126	5,329	38,031

TRANSPORTATION COSTS5/AS A FACTOR IN RESOURCE DEVELOPMENT

Economic data tend to age rapidly and transportation cost statistics are no exception. There have been some rail rate changes since 1955 which affect the market position of Mountain States sawmills. No doubt the most significant of these was a 1958 rate reduction from Montana to some midwest points. These reductions probably averaged something less than 3 cents per 100 pounds for the area involved. Nevertheless, they were not large enough to materially alter the relationships discussed in the following pages.

The Mountain States lumber industry's heavy dependence on outside markets is likely to continue for a long time. Interregional freight costs, therefore, are a matter of continuing importance. Freight charges can amount to as much as 30 percent of the cost of a board to a consumer. While the economic position of the lumber industry in this region involves a number of other factors beside freight costs, the

rate structure can either hamper or facilitate resource development.

The statistics on rail freight revenues point to a few general conclusions relating to lumber transportation costs in the Mountain States. First is that average transportation costs on lumber shipped out of Idaho and Montana are higher than for lumber shipped from the other six Mountain States.

Table 6 shows that the central and southern Mountain States (represented by Colorado and Arizona) have an important transportation advantage in shipping to midwestern States. For example, Colorado mills paid 40 cents per hundred pounds less to ship lumber to Illinois than did Montana mills in the year 1955. The advantage of Colorado mills in shipping to Illinois is a factor of distance. The rates and hauling distances from Montana and Colorado are proportional. However, distance is not the only consideration. Arizona and Montana are both 1,500 miles from the Illinois market; yet it costs about 25 percent less to ship lumber from Arizona than from Montana.

_5/Rail freight costs as discussed here are actual charges for lumber shipped in the 3-year period of 1953-55. They tend to be somewhat higher than the basic published rates because the charges per 100 pounds on carloads not meeting minimum weight requirements are higher than the published rates.

Table 6.--Reported revenue on lumber shipped by rail from Montana, Washington, Colorado, and Arizona, 19551/

Destination state	Montana	Washington - Cents per 10		
North Dakota	85	97	<u>(2)</u>	(2/)
South Dakota	98	97	<u>(2)</u>	(2)
Kansas	103	107	15	81
Wisconsin	113	115	83	<u>(2)</u>
Illinois	116	122	76	87
Ohio	127	124	(2)	96
New York	131	126	112	125

Decause of lightweight carloads (a problem more common with Mountain States species than with west coast Douglas-fir), rail revenues do not precisely reflect freight rate differences. For example, the basic freight rate to New York from Montana and Washington is the same. However, variations due to light loads do not obscure the fact that the lumber freight rate position of Montana and Idaho is not as favorable as their geographical position in relation to midwestern and eastern markets.

2/No shipments recorded.

Source: Interstate Commerce Commission.

Table 7 shows the net effect of favorable and unfavorable freight rates and of longer and shorter shipping distances. It also shows that compared to Montana and Idaho, the other Mountain States enjoy an advantageous position in relation to both the Plains and Central States markets, either because they are closer or because rates per mile shipped are lower.

The second conclusion that can be drawn from statistics on rail freight revenues is that some of the Mountain States are not fully exploiting certain marketing opportunities. For example, Colorado and Wyoming, the two States best situated from a market standpoint, do not have as large a lumber industry as might be expected. This indicates that shipping costs are not the sole factor influencing industrial development. The lag of the industry in these two States probably can be ascribed to the fact that they have relatively little ponderosa pine timber, and have not developed a highly competitive industry. For example, in 1954 there were 51 sawmills in Idaho and Montana producing 10 million or more board feet of lumber annually; but only two mills this large were operating in Colorado, Wyoming and Utah. Over the years, the larger sawmills with their more complete manufacturing facilities, better utilization, and more effective marketing have been the strong, competitive segment of the Mountain States lumber industry (fig. 11). One of the problems of the lumber industry in Colorado and Wyoming is to live down a reputation in the minds of some buyers for producing poorly manufactured lumber. 6/

Table 7.--Average cost of hauling lumber by rail from Mountain States to the Northeast, Central, and Plains States, 1953-55

Origin state	N. E. Cents	Cent. per 100	
Montana	131	100	98
Idaho	127	113	98
Wyoming	(1)	85	32
Nevada	113	114	(1)
Utah	(17)	(1)	(1/)
Colorado	(1)	71	43
Arizona	(1)	93	79
N. Mexico	(1)	90	(1)

1/Less than 200 tons in sample.

Source: Interstate Commerce Comm.

Certainly, the kind of wood needed, customer desires and prejudices, salesmanship, and quality control can go a long way toward modifying the effect of freight rates on distribution patterns. However, it is also true that once the industrial deficiencies are overcome, Colorado and Wyoming will have an important geographic advantage in marketing lumber.

<u>6</u>/Lange, Robert W., and Carl A. Newport. 1957. Can Native Lumber in Colorado be Made More Acceptable in the Markets? School of Forestry and Range Management, Colorado A&M College, Res. Note 6.

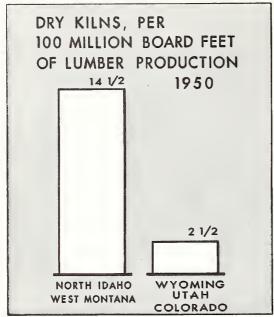


FIG. 11 Source: Forest Production Industries Directory, 1950

The third conclusion that can be drawn from available waybill data is that lumber producers in Idaho and Montana extract little advantage from their position on the map. They are 200 to 900 miles nearer to Plains, Central, Northeastern, and Southern States than Washington, Oregon, and California plants, but that fact is not especially evident in lumber shipping costs in the 1953-55 period.

Consider the following:

The actual lumber haul distance from the Pacific Coast States to the Northeast was 18 percent longer? than from Montana and Idaho, but the rail freight cost per 100 pounds was identical.

The actual Pacific Coast haul to the Central States was 35 percent longer, but the shipping cost was only 9 percent higher.

The actual Pacific Coast haul to the Plains States was 36 percent longer, but the shipping cost was only 7 percent higher.

State-to-state average freight revenues must be interpreted with caution because rates are actually established between specific points, and there may be substantial differences between rates from or to cities in the same state. Nevertheless, waybill summaries sharply emphasize that Montana and Idaho lumber producers are in no way favored by the rate structure to the Plains States and points beyond.

The comparison is not simply a matter of west coast mills getting a lower rate per mile because they ship farther. Figure 12 shows that for *equal* distances from 800 to 2,100 miles, Idaho and Montana rail rates averaged higher than Washington, Oregon, and California rates for the same distances. For example, for a 1,000-mile haul, an Idaho or Montana sawmill paid more than a Washington, Oregon, or California sawmill for the same length of haul.

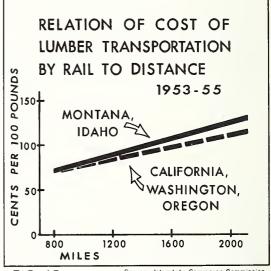


FIG. 12 Source: Interstate Commerce Commission

The above linear curves are fitted to weighted average hauling costs and distances, origin states to destination states. Slope of Idaho and Montana curve = 0.045; Oregon, Washington, California curve = 0.0034. Difference between slopes very highly significant (t = 37.7***).

[🗾] The rail distance figures are based on the weighted average haul of actual lumber shipments during 1953-55.

OPPORTUNITIES AND PROBLEMS

There is reason to be encouraged over the way things are going in the Mountain States. Time and circumstance are bringing about progressively greater lumber development in the region. Obviously, there is opportunity to sell more lumber right within the region. Certain transportation advantages to the Plains and Central States markets appear to be open to further exploitation.

Two fundamental situations enter into the outlook. First of these is that the virgin stands elsewhere in the West are progressively being liquidated; this assures that competition from these areas will be somewhat less intense than it has been in the past. Second is the fact that the Mountain States region has a very large part of the soft-textured softwood timber for which there is good demand throughout the Nation.

While the situation is promising, it is not without its problems. The data presented in the preceding pages focus attention on two principal aspects of the marketing situation.

Other factors than transportation costs are holding back development of Mountain States lumber. Obviously freight rates cannot be blamed for failure of sawmills in Colorado and Wyoming to capture more of Plains States and Central States markets. The problem, therefore, becomes one of getting greater acceptance of local

lumber and of taking a hard look at the lumber industry itself in some localities. To what extent does the present situation result from substandard manufacturing or inadequate sales effort, or a combination of these factors?

Lumber freight rates are affecting resource development patterns. In the establishment of lumber freight rates from the Southwest, the public interest in full development of the timber resource seems to have been recognized. The evidence indicates that resource development has had less recognition than it should have had in some other parts of the Mountain States region. This seems particularly evident in regard to rates from Montana and Idaho eastward.

Removing all the inconsistencies from a patchwork, piecemeal rate structure is perhaps an impossible task. Nevertheless, a complete and objective analysis is needed to indicate what changes in rates might be justified in the interest of facilitating development of the timber resource. In some localities the gain from more favorable rates would be larger lumber production. Elsewhere, however, the main gains would be better balanced utilization so that a proper share of the lumber cut comes from the smaller, less valuable and less accessible timber not now being fully utilized. This would mean, of course, sustaining a larger lumber cut in the long run.









